

THE FOSSIL RECORD



NEXT MEETING: WEDNESDAY, AUGUST 11TH... ONLINE!

STRANGER THINGS



“Heteromorph” has multiple meanings in paleontology, but with ammonites it means having a different form at different life stages, so that the fossil is not a simple coil or spiral. The common *Ideohamites* of North Texas looks like a candy cane. But that is nothing compared to *Didymoceras*. At our next meeting on **Wednesday, August 11th**, we will learn about the growth of this strange creature from **Steve Jorgensen** of WIPS in his talk “**Ontogeny of *Didymoceras* Hyatt, 1894, Late Cretaceous (Middle and Upper Campanian) U.S. Western Interior.**” We will start the online meeting on Zoom at **6:30pm Central** time, with informal chat and show-and-tell of fossils. Strange ammonites are welcome. The formal meeting will start at **7:00pm**.

Steve Jorgensen grew up in South Dakota on the Pierre Shale and found his first ammonite as a teenager. He received a BS degree in Geological Engineering from the South Dakota School of Mines and Technology, and is a licensed Professional Geologist and Professional Engineer working primarily in the oil and gas industry. He was in on the founding of the Western Interior Paleontological Society (WIPS) in 1984 and its first president. Steve even suggested the name. He co-authored “**Ammonites and Other Cephalopods of the Pierre Seaway**” in 1997 with Neal Larson, Robert Farrar, and Peter Larson, and has two ammonites named in his honor, *Collignonoceras jorgenseni* (Kennedy *et al*, 2001) of middle Turonian age (our Eagle Ford Shale), and *Didymoceras jorgenseni* (Kennedy *et al*, 2000) of late middle Campanian age.

Please continue to the next page (page 2) for instructions on how to register on Zoom and join the meeting live online...

AUGUST DPS MEETING (LIVE ONLINE): HOW TO JOIN US

by Tom Dill

We recommended creating a free **Zoom** account at <https://zoom.us> before the meeting (and you will receive a confirmation email), and then installing the Zoom application on your computer (Mac, PC, or Linux). You can also get the app for tablets and phones from the Apple or Android app stores, then click on this link to join the meeting on **Wednesday, August 11th at 6:30pm Central Time** for informal chat and show-and-tell of fossils, with the formal meeting starting at **7:00pm Central Time**:

<http://zoom.us/j/83870734914>

If you haven't used Zoom before, join early and you can test your audio and video; and if you cannot install the application, you can also use a web browser (they recommend Google Chrome). Or start the Zoom app and join the **meeting ID of 810 9354 9574** and **passcode is 589866**.

If you move your mouse over the Zoom window, controls will appear where you can turn on and off your audio and video "feeds" to the meeting. Remember that you are on camera to the world and, if your audio feed is on when you cough or the dog barks, Zoom will switch the focus to you. So, please be respectful and mute your audio until you want to talk. Make yourself familiar with the Zoom controls, which appear when you move the mouse over the window, and learn where and how to turn on and off (mute) your audio, and your video feed. Be aware that your spacebar also mutes and unmutes your microphone (you can change that setting also).

During the presentations, we will mute everyone's audio, but if you come in late, be sure to mute yourself. You can submit questions for the speaker in the chat box, typing "QUESTION" to make them stand out. We will read them at the end in the order received. We would love to see you (appropriately dressed) and hear you (at the appropriate times) at our next meeting!

We hope to see you there!



Didymoceras from Upper Cretaceous
Pierre Shale of the US Western Interior
(closeup of specimens on previous page).

WONDERING WITH THE DPS PRESIDENT

by Estée Easley

Many of you have asked, and I'm sure many more are wondering, when we will start meeting in person again. The short answer is: we don't know. Brookhaven doesn't have an answer for us yet, and we are trying to find an alternate location. We have had great success with our virtual meetings, and several of our regular online attendees are out of the DFW Metroplex. When we do secure a physical room for our monthly meetings, we intend to keep the presentations available via Zoom or similar platforms for those unable to be there with us. I'm sorry I don't have a better answer at this time, but I will absolutely let everyone know when we do get a place.



Another hiccup is the annual holiday party/auction. We are working on securing the usual location, but we do not have confirmation at this time. Again, we are trying to pin down an alternative site for this event.

Thank you for your patience and your understanding.

REBUTTAL FOR SHARK WEEK

In defense of the image of sharks (as portrayed by Discovery Channel's Shark Week), from Roger Farish:



NEED VOLUNTEERS FOR



October 29 - 31, 2021
Somervell Expo Center @ Glen Rose, TX

Volunteer opportunities include prep, set-up, take-down, education, promotion, merchandise, advertising, networking, and other activities. Free admission to FOSSILMANIA provided. Indoor and outdoor locations.

Contact education@dallaspaleo.org for further details.

AUGUST 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11 DPS Monthly Meeting online	12	13	14 Oliver Creek Field Trip
15	16	17	18 DPS Monthly Executive Meeting online	19	20	21
22	23	24	25	26	27	28
19	30	31	Visit dallaspaleo.org for most up-to-date information and further details.			

SAVE THE DATE FOR CHRISTMAS!

Event Announcement by Lucia Smith

SAVE THE DATE: DECEMBER 8, 2021

HOLIDAY PARTY/AUCTION AND MEETING

Come one, come all! Come and see all your paleontology friends **IN PERSON!**

We really need volunteers to bring your favorite *hors d'oeuvres*, appetizers, salads, vegetables, casseroles, or side dishes to accompany our Main Dish of Ham provided by DPS. Of course, breads, desserts or other treats to share will be welcome.

Location to listed at a later date.

Contact Lucia at hospitality@dallaspaleo.org to volunteer.



DPS JULY MEETING: “PLESIOSAURS, PLEASE”

Lecture Overview by Kim Pervis

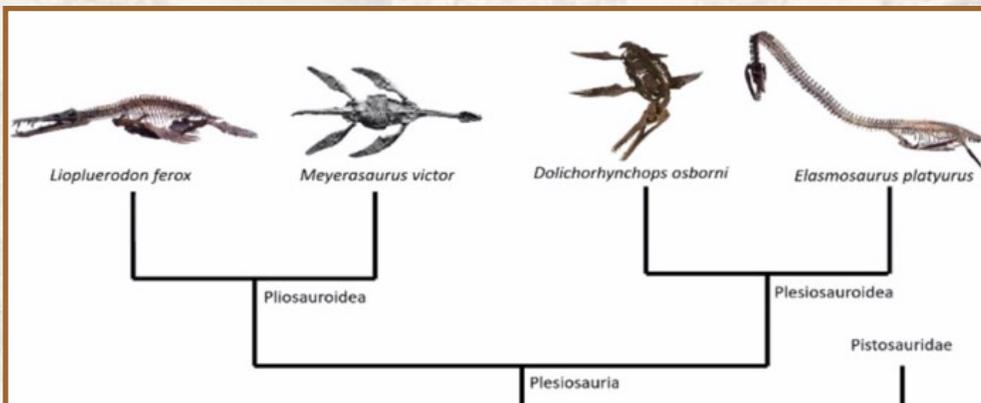
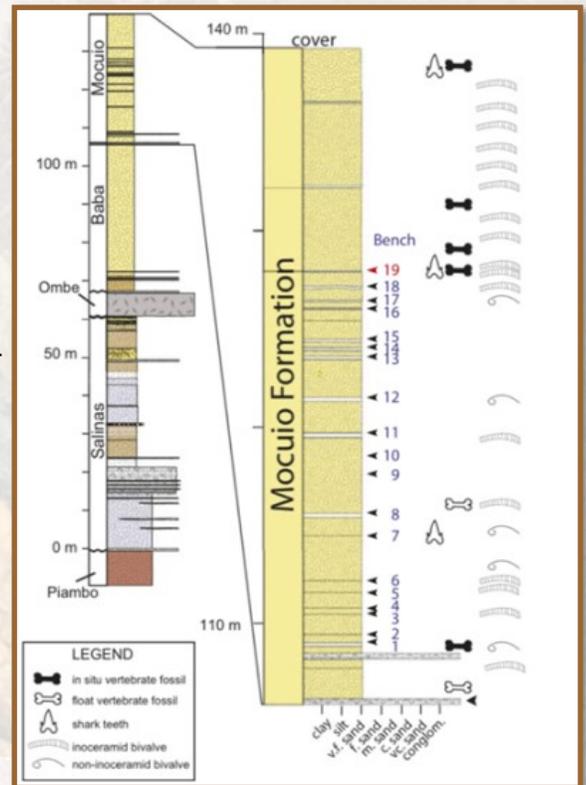
On July 14, 2021, we held our Dallas Paleontological Society meeting. Via Zoom. Our speaker was Miguel Marx. The title of his talk was “The Plesiosaurs of Bentiaba, Angola.”

Miguel earned double bachelor degrees in biology and geology from the University of Mary Washington in Virginia. During this time he helped excavate a pterosaur trackway in Lourinhã, Portugal led by Dr. Octávio Mateus from the New University of Lisbon (UNL). He then attended UNL for his master’s degree under Dr. Mateus. He focused on a new elasmosaurid plesiosaur specimen, excavated from Angola by the Projecto PaleoAngola team (an SMU partnership) in the summer of 2017.

Angolan geology and paleontology had not been revised since 1965 due to the Angolan Civil War that broke out in 1975 and continued intermittently until 2002.

The first Projecto PaleoAngola was in 2005 and focused on the formations of the South Atlantic coast and several inland sites. Miguel’s studies were conducted on Bentiaba plesiosaurs in cooperation with Projecto PaleoAngola. In particular, the site is located on the Atlantic coast of Angola in the Mocuio Formation. The particular layer of interest is referred to as “Bench 19 Bonebed.” Bench 19 is Cretaceous Campanian-Maastrichtian in age. See stratigraphic figure of the Mocuio Formation (Figure 1). The Bench 19 bonebed is the richest vertebrate bonebed in the southern hemisphere (Figure 2). It was a marine paleo environment that is estimated to have been 50 to 100 meters deep. It was relatively cool at 18° C (64° F).

At least six genera of Mosasauridae, two types of Plesiosauria, and four genera of Testudines (sea turtles) have been described from the locality. Traditionally, plesiosaurs were lumped into two categories: Pliosauromorphs (those with short necks with large heads. e.g. *Liopleurodon ferox*) and Plesiosauromorphs (those with really long necks with up to seventy-five cervical vertebrae and small heads. e.g. *Elasmosaurus platyrus*), but not all plesiosaurs fit easily within these two groups. Some have features that group them with one or the other despite their neck length (See Figure 3).



Continued next page

Stratigraphic section of Bentiaba, with Mocuio Formation enlarged (Figure 1, top right); Campanian-Maastrichtian Beach 19 bonebed (Figure 2, bottom right); and Plesiosauria phylogeny (Figure 3, left).

DPS JULY MEETING CON'T

It may be of interest to those in the Dallas area that *Libonectes morgani* is an elasmosaur plesiosaur that was discovered in a concretion in Dallas County, Texas. It has an amazingly well-preserved skull. It was acid prepared. It is housed at the Schuler Museum at SMU. For many years, this elasmosaur was the model for much of elasmosaur skull anatomy, because very few plesiosaur skulls are ever preserved.

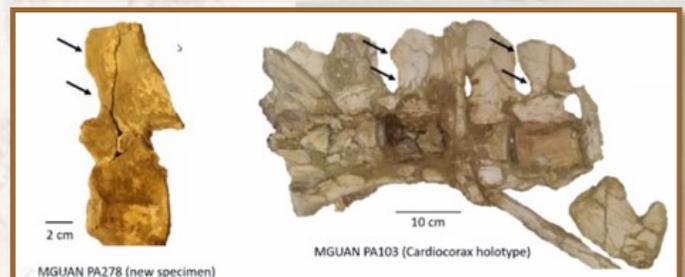
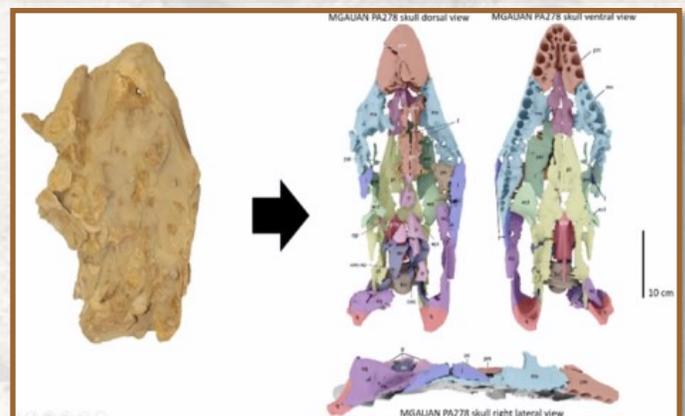
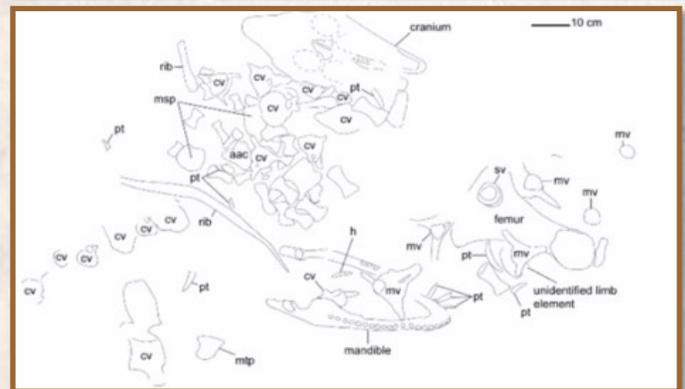
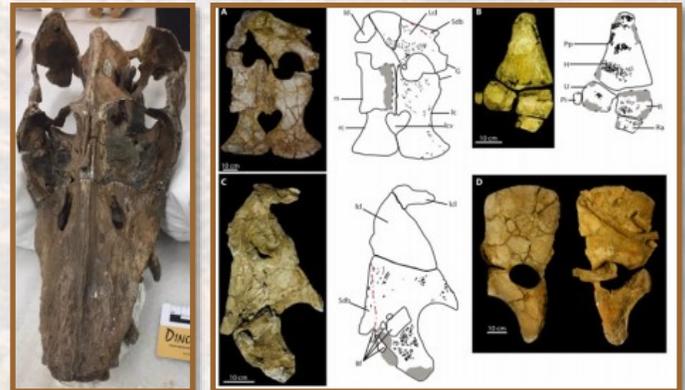
The two plesiosaurs found in Bentiaba, Angola: *Cardiocorax mulkulu* will be discussed first and followed by *Aristonectine* sp.

***Cardiocorax mulkulu*.**

Cardiocorax is the holotype. It was first described in 2015 from post-cranial bones alone, Specimen PA103. Some are shown in Figure 5 below. The pelvic girdle has a heart shaped fenestra in it, which the name was derived from. It also included part of a forearm and cervical vertebrae.

In 2017, a mandible, ribs, cervical vertebrae, pelvic girdle limb bones, and a skull of plesiosaur were found in an outcrop that was being excavated. Figure 6 is a toponymic map of Specimen PA278. Many of the bones overlapped with PA103, so they knew it was *Cardiocorax*. MV in Figure 5 represents a mosasaur vertebra that was found among the bones. Also, *Squalicorax pristodontus* and other shark teeth were also found with the bones.

The skull was transported from Portugal to Austin, Texas, to get a CT scan while still in the block. This allowed them to see the brain case, pallet, and other features that would not have been visualized otherwise. Following the CT scan, Amira software was used to draw out the bone boundaries and create an image of the skull surface. This was done at the ISCM Digital Earth Science Lab at SMU, which is run by Mike Polcyn (Figure 7). The skull pre-CT scan is on the left. The CT scan images are on the right. The color coding was done using Photoshop from Specimen PA278 they were able to determine that *Cardiocorax* is a basal elasmosaurid. Of note regarding the cervical vertebrae of *Cardiocorax*, they have neural spines of the middle and posterior cervical vertebrae that is nearly as long as the centrum and exhibits a sinusoidal anterior margin. This is a diagnostic feature that can distinguish the species from other elasmosaurians (Figure 8).



Libonectes morgani (Figure 4, top left); *Cardiocorax mulkulu* (Figure 5, top right); toponymic map PA278 (Figure 6, second); skull of PA278 (Figure 7, third); and *Cardiocorax* cervical vertebrae from PA103 and PA278 (Figure 8, bottom).

Continued next page

DPS JULY MEETING CON'T 2

In addition to the skull being modeled in the CT, the semicircular canals were also imaged. Semicircular canals are part of the bone structure that helps provide info to our brains regarding our spatial orientation and balance. The canals are filled with a fluid called endolymph that help with detecting head movement.

In a study, Neenan *et al.* (2017) compared the shape of the semicircular canals in marine reptiles (Figure 9). Note the narrow semicircular canals at the top in green. The narrow openings are believed to be characteristic of marine reptiles that live near the shore. Whereas those semicircular canals with larger diameters are representative of those that live in the open ocean and are considered pelagic, as modern-day whales are. The shape of the canals in *Cardiocorax* is representative of an animal that lived out in the open ocean. Modern sea turtles also share the same shape of canals. Since the paleoenvironment has been described as fairly shallow, only around 100 meters deep, these bones would have been deposited by currents or storms.

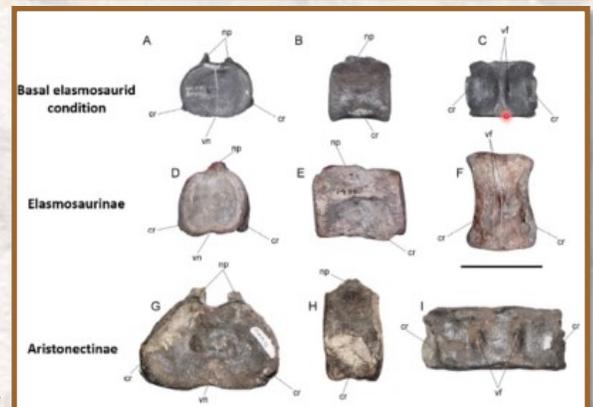
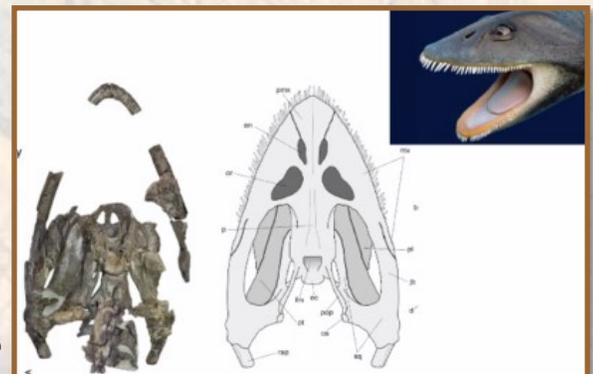
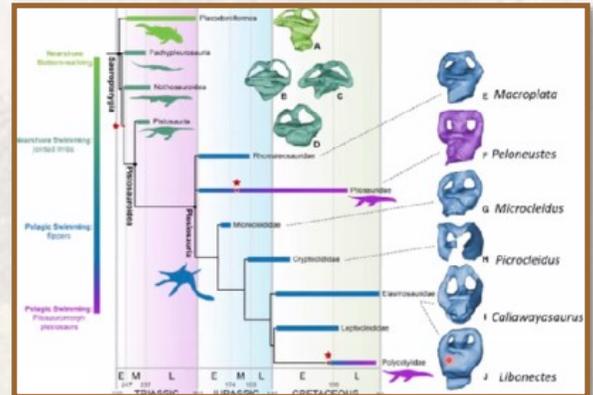
Aristonectine sp.

The second type of plesiosaur found in Bentiaba, Angola is *Aristonectine sp.* They are characterized by broad skulls, bowed out mandibles, high number of teeth that were oriented outward or procumbent (Figure 10). They also had anteroposteriorly short cervical centra, meaning really short neck vertebrae. Their cervical vertebrae width is almost twice that of their length (Figure 11).

A unique characteristic of *Aristonectine sp.* is that their ribs are not fused to the centra of vertebrae when adults. In other varieties of plesiosaurs the adult ribs fuse to the centra. Other juvenile features were also noted in *Aristonectine sp.* They were a smaller variety. Bone histology of the long bones of *Aristonectine sp.* reveals that the bones are indeed adult. This characteristic of retaining juvenile traits into adulthood is called pedomorphic. In essence, *Aristonectine sp.* were dwarf plesiosaurs.

The talk was in large part an overview of the currently published work on *Aristonectine sp.* and *Cardiocorax*.

However, while Miguel was reviewing all of the Angolan plesiosaur specimens in the collection at SMU, he was able to identify ten different specimens that appear to be *Cardiocorax*. Not all of them appear to be adults. The specimens are currently being studied to understand how bone morphology changes during *Cardiocorax* maturation. No other collection anywhere in the world is known to have both juvenile and adult plesiosaurs from the same location. We can expect to see the findings of his studies in a future publication.



Comparison of semicircular canals in marine reptiles (Figure 9, top); *Aristonectine sp.* skull diagram (Figure 10, second); comparison of three varieties of plesiosaur's vertebrae (Figure 11, bottom).

AMBER FEVER

by Gene Hartstein

Fossil Fever leads one to do strange things. A bad case of it drove me to spend the better part of my free time, for my six years in Illinois, climbing up and down hills collecting Mazon Creek concretions in the hope that one or more of these rounded lumps of siderite would contain a rare and spectacular fossil. In the process, I nearly ruined my knees from constantly climbing steep slopes, often with 50 to 100 pounds of rocks on my back. I have walked many miles along lonely beaches in cold weather in the hope of encountering a large shark tooth or a porpoise skull. I have planned vacations, even my honeymoon, around fossil expeditions and, in my lifetime, I have hauled as much as 200 tons of rock and gravel back to my house for further inspection. I have lived in New Jersey, Delaware, Puerto Rico, Texas, and Illinois and have collected in all those locations plus many nearby and not-so-nearby ones.

Fossil collecting in the Middle Atlantic States is somewhat different than what I have encountered in other parts of the US. For the most part, fossil collecting in the Midwest, Texas, and many other places involves visiting localities that are either in quarries or in places that have been around for a long time and promise to remain for some time to come. As a result, one is rarely driven to the insanity characteristic of Middle Atlantic Fossil Fever. Here road building and other construction activities suddenly expose prolific fossil sites only to bury them, just as suddenly, under roads and shopping malls. Sometimes, such sites remain the secret treasure-trove of a few lucky collectors and are buried before others can find out about them.

Back in the early 1980's construction activities at a site near I-95 east of Washington, DC exposed Late Cretaceous sediments of the Severn Formation: Preparation of the site for the buildings to come uncovered portions of the formation rich in vertebrate remains, including mosasaurs, plesiosaurs, crocodilians, fishes, sharks, chelonians, and dinosaurs. Nearby, in the same group of excavations, a concretionary layer was exposed. The concretions contained a rich mollusk fauna, which included large nautiloids and ammonites. Recognizing the transitory nature of the locality, I wasted no time breaking and inspecting the concretions at the site. Instead, I repeatedly filled the back of my VW Rabbit with whole concretions, until I had nearly bottomed out the springs, then drove home, unloaded the concretions and returned for another load. On occasions over the three- to five-month period, I made four trips in a weekend, which meant 16 hours of driving time, plus several more hours to cover the collecting, loading, and unloading. I was rewarded with a number of excellent nautiloids and several large, showy ammonites of the type usually seen only in collections from the Western Interior States and Canada. Neighbors must have questioned my sanity as the pile of concretions, some of them weighing up to 150 lb., grew in my yard. Within one summer, nearly all the good collecting was ended as topsoil and seed replaced construction piles. Over a dozen years later, in the spring of 1997, I was overjoyed, to learn that construction of an I-95 exit for the new Washington football stadium had exposed more of the same sediments. I fought the Washington rush hour traffic on a Friday afternoon to visit the site. This time the exposure showed but a dim glimmer of past glories. I couldn't even find enough concretions to fill the back of my truck, but I was able to add one more lovely nautilod, in matrix, to my collection. But insane as all my past excesses may seem, nothing compares to Amber Fever.



Me digging!

In the movie *Jurassic Park*, there is an early scene of miners collecting amber in the Dominican Republic for dinosaurian DNA. While this amber is quite beautiful and often contains excellent inclusions, it is far too young to contain dinosaur DNA. New Jersey amber, on the other hand, is more than old enough, predating the demise of the dinosaurs by about 30 million years. Cretaceous amber is the oldest amber known with fossil inclusions, the oldest, coming from Lebanon, up to 130 million years old. Nonetheless, at up to 95 million years old, New Jersey Cretaceous amber is pretty old....for fossiliferous amber. Cretaceous amber from the eastern US has been known for over 150 years and has been found in Maryland, Delaware, New Jersey, Staten Island, Long Island, and Cape Cod.

Continued next page

AMBER FEVER CON'T

It should also be noted that some authorities maintain that to be called amber a fossil tree resin must contain several percent succinic acid. Succinic acid, a characteristic of Baltic amber, is an indication of the botanical source of the resin rather than the age or degree of fossilization. New Jersey Cretaceous amber contains no succinic acid and appears to have more than one composition, indicating either a different botanical source, different preservational history or both. For the purposes of simplicity I will refer to it as amber rather than a fully polymerized non-succinitic fossil resinite of unknown botanical origin.

The Raritan Formation consists of clays and sands with seams and pockets of lignite. Amber is occasionally found in, or near the lignitic seams. The lignite was mined for fuel back in the late 19th century. Horror stories are told of miners at the turn of the century burning drums full of amber to keep warm in the winter. In the 1960's New Jersey collectors began collecting amber from exposures of the Raritan and the overlying Magothy Fm. Over the years a number of pieces of amber were collected in the area near Sayreville, NJ. Sometimes the amber contained fossil inclusions. Such pieces were rare finds indeed, containing insects of an age much older than the Tertiary-Age Baltic or Dominican material. Poinar noted in 1992 that less than 300 pieces of fossiliferous amber were known from New Jersey Cretaceous deposits. Poinar had no way of knowing how radically things were about to change.

Sayreville, New Jersey, is a small, Atlantic-coast town across from Staten Island, NY, perhaps best known as the place where rock star, Jon Bon Jovi, grew up and later played at local clubs. At first glance, Sayreville appears to be something of an anachronism. The new cars and trucks seem out of place with the cinquegenarian homes and shops lining the main road. They belong to the era of Frank Sinatra or earlier rather than the era of the Stone Temple Pilots. Travel off the main road and one finds modern developments springing up where clay pits once stood. Years ago, most of the folks in the town worked either at the nearby photo products plant of the DuPont Co. or in the brickyards of the Sayre & Fisher Brick Co. Today, many make the daily commute to New York City. The Sayre & Fisher Brick Co. was established over 100 years ago and over the years the company has mined the extensive clay seams of the 95-million-year-old Woodbridge Member of the Raritan Fm.

Sayre & Fisher bricks were part of many buildings in New Jersey and nearby New York City, among them the Empire State Building. Years ago, it was common practice to mine an area for clay well below the water table. The land cost money and so did clearing the overburden, so mining proceeded until it was no longer economically feasible. Water-filled holes from marl and clay pits, dug during the fossil glory days of the nineteenth century, dot New Jersey from Monmouth to Salem County. With the introduction of environmental laws in the last twenty years it has become more economical, in many cases, to clear the area and sell it for homes, rather than to risk an environmental liability by entering the water table. Thus, a large tract of Sayreville land was mined flat to roughly 10 feet above the water table and left for a housing development. It was here, in about 1990 in an empty field in Sayreville, bordering on a new housing development, that amateur fossil collectors first discovered amber.... lots of it.

I heard about the site in 1993, but was living in Illinois at the time and so I resigned myself to the belief that I would never get to collect there. When I was transferred to Delaware in 1994, all thoughts of collecting were put on hold while I got my new house in order. But, Fossil Fever is a glowing ember that never quite dies and so it was inevitable that I would drive to Sayreville to check it out. I told myself I would be satisfied to find just a few small pieces of amber. I should have admitted to myself even then, it was a lie but many of us lie to ourselves throughout our lives. Getting the location from a friend, I drove there with my friend Larry. We crawled around on our hands and knees.

Continued next page

AMBER FEVER CON'T 2

In a few hours I had perhaps a film case full of small drips. I watched as more experienced collectors dug four-foot and deeper trenches to collect bigger pieces. I listened to stories that I decided were great exaggerations, tales of pieces the size of golf balls....(no softballs, that's the ticket). Deciding to try some digging I found a seam of lignite near the surface and dug some up. That night I went home with a number of pieces including one piece, the size of a dime, containing my first Cretaceous insect in New Jersey amber.

Once reignited by a new site and fueled with anticipation the embers of Fossil Fever rage anew. The next week, and for many weekends thereafter over about 1½ years, I spent digging amber. The process involves digging through several feet of thick clay to reach and extract bedded seams of lignite. The pieces of lignite are carefully parted to collect the amber. I soon learned to distinguish between good seams, likely to contain large pieces of amber, and bad seams that contained only small bits. I also learned to dig in the morning when it was cool, leaving the less exerting inspection process to the hot summer afternoons. The clay layers were sticky and difficult to dig through in wet times and rock hard in dry times. I was either using a pickax to break up the hard clay or shaking each shovel full to get the sticky clay to drop off of the shovel. Either way, digging a hole was far more work than digging through ordinary soil. Often it was necessary to dig through four feet of clay to hit the first, often poor, lignite layer. Sometimes, I would come up with good pieces, and sometimes I found oxidized pieces, crumbly and opaque. Other times I would shudder as a loud crunch announced my shovel had just shattered a large piece. In the process my back ached, my arms burned and cramped and I often developed an insatiable thirst. My hands developed small and painful cuts and became impregnated with carbon, so that they never really washed clean. My clothes became likewise impregnated, despite numerous washings. I christened a number of pairs of jeans as official collecting jeans. One could wash out the sweat and dirt, but not the lignite. I also learned to take off my shoes and socks, roll up my pants cuffs, and wash my feet before entering the house. I had to undress on a towel in the shower so the black dirt that literally fell off me would not stain the bathroom floor. In short, I willingly did what it is probably illegal to force convicted felons to do.

As I dug I listened to tales of great finds from the area, a feather, a mushroom, a flower, cockroaches, wasps, and more. I listened to tales of softball and bigger sized pieces and I learned that many of the stories, fantastic as they were, were true. I usually went home with less than a cup of amber. Rarely I was luckier. It was all in the luck of the draw. Once I gave up exhausted, only to learn that another collector had extended my diggings and found a softball-sized piece just inches from where I'd stopped. I wished for x-ray vision more there than I would have wished for it at the nearby casinos.

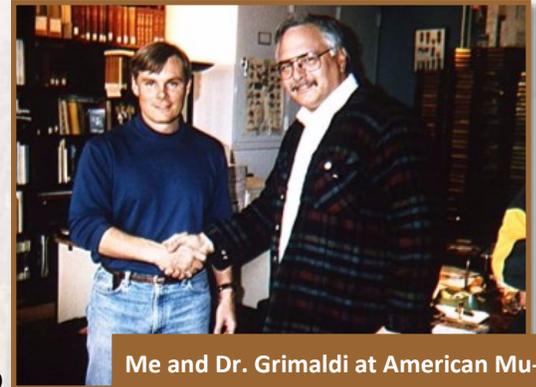
Evenings were spent washing and inspecting the amber for inclusions. As the cold days of late autumn 1995 rolled on, I spent the cool November and December weekend days digging as usual. In mid-December I was finally rewarded. Near the surface I had found a glory hole. I worked the layer of the coarse lignite I had learned to look for. It dipped at about a 20 degree angle and I followed it until I had dug a patch about 7 feet square, sloping from about 8 inches deep at one end to over 4 feet at the other. That night I went home, after working from sunup to sundown, with over a quart of amber. The next week I returned and dug with my friend Alex, until we had cleared out another huge section. We returned home with over a pint each. Then the snows came. A few hardy souls, I later learned, had dug holes through the winter snow and cleaned out the pocket. Such prolific seams are not the rule and I was back to less than a cupful per day as the spring of 1996 rolled around.

By late spring the site was beginning to resemble a bombing target area covered with craters dug by hand. Unworked areas along the best line were tougher to find than an honest politician and the water that filled most of the abandoned holes would often come bubbling along a sandy layer to flood the one you were digging nearby, before you hit "pay dirt".

Continued next page

AMBER FEVER CON'T 3

Then in summer of 1996, another glory hole. This time it was deep, over seven feet down, sometimes more, but it was a rich area. Over the next few weeks Alex and I teamed up and worked the seam. Other diggers worked nearby, just as eager to find a big piece or a rare inclusion. Not taking time to inspect the rich lignite, we filled my Blazer with bags full of lignite and hauled them home for later inspection. That allowed us to work from sunup till sundown. We ultimately divided well more than a gallon of amber including a few large pieces up to two inches in diameter and 6 inches long. Some of it was clear, some opaque, and some translucent. Some bore cracks and other evidence of mechanical damage caused by our digging or by natural processes. Some pieces were barren, while others, most commonly the multi-layered drip tubes we eagerly sought, contained multiple insect inclusions.



Me and Dr. Grimaldi at American Museum of Natural History, New York.

In addition, we had dug up a section of a tree with a seam of amber in it. We each took half of a section that had split lengthwise and saved a larger, whole piece for Dr. Grimaldi at the American Museum of Natural History (AMNH). During the digging, we and others had often found sections of lignitized branches or logs but never with amber in them. Here was a smoking gun. A log with the amber inside. If the lignite could be identified to the genus level, at least one source of the amber would be known for sure. It was something Dr. Grimaldi had to have.

It had always been our expressed intent to give Dr. David Grimaldi his pick of the pieces. After all, we were digging in an area he had the permission to collect and he was in the process of putting together a monograph on the site. A few months earlier, I had sent a package of over a dozen of my best pieces to him. He asked for a few of them and I was glad to comply. There was one particular specimen, mostly occluded by debris, that I knew was special. Most insects we had found, with very few exceptions, were one to three mm long. This one was easily over a centimeter and it looked different. I would later learn from an excited Dr. Grimaldi that it was the oldest paper wasp found in North America. I later saw it in Dr. Grimaldi's office. Prepared and encapsulated in resin it was beautiful.

In November 1996, Alex and I visited Dr. Grimaldi at the AMNH. He was rather gracious and spent quite a bit of time identifying the material we brought. Between Alex and myself we donated a number of good specimens, the log, a number of flies, wasps and mites, a chironomid with a mite on its wing, a bristletail, and Alex's pride and joy.

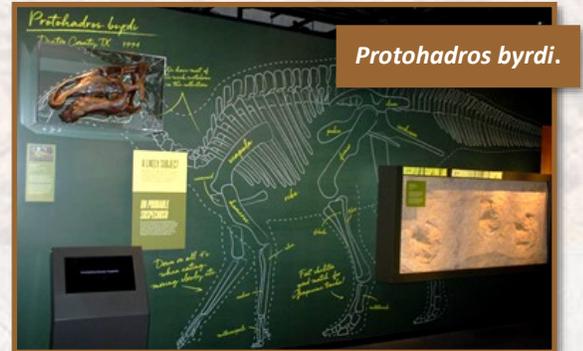
A few months earlier, Alex had called me on the phone. He was eager to show me what he'd found, but he was playing it cool. He wanted me to look at a specimen before he told me what he thought it was. I knew it was something incredible by his deliberate tone and demeanor, that poorly hid his excitement. That night I sat at my kitchen table peering through my microscope at the piece while Alex waited for my word. As I brought the inclusion into focus, my jaw dropped. It was unmistakable. There, in a small piece the size of a nickel, partly exposed at the surface, was a Cretaceous feather. And so the feather, Alex's pride and joy, went to the AMNH along with the other best items. We later learned that there was as total of three feathers inside.

Late in 1996, just prior to our visit to Dr. Grimaldi, the AMNH undertook a major, mechanized dig of the site. They surveyed, uncovered, mined and mapped a major portion of the main digging area and had it refilled and bulldozed flat. They also announced that the site was officially closed. In all I doubt that more than 1000 pounds of amber has been collected at the site. Most of it does not contain fossil inclusions. This is a mere speck compared to the many tons taken from Baltic and Dominican sources. From time to time I revisit the site on my way somewhere else hoping to see bulldozers and the start of a new group of houses. Such activities would undoubtedly uncover more amber and leave it exposed for easy picking. The digging at the site has not stopped and more seams have apparently been found, but my own fossil fever had returned to a glowing ember, that was until I visited Muddy Creek. But that's another story.

PEROT MUSEUM OF NATURE AND SCIENCE'S “GUINNESS WORLD RECORDS” EXHIBIT (DALLAS, TX)

Review by Tom Dill

It was fantastic be able to see the Perot Museum again! All of the favorite fossils, the marine vertebrates of the Dallas area, Alaskan dinosaurs, vertebrae and full cast of *Alamosaurus*, and others are still there. *Quetzcoatlus* soars and *Protostega* swims overhead. If you haven't been to the Perot for a few years, there are several changes. A cast of Stan, the *Tyrannosaurus rex* which recently sold for over \$30 million, greets you at the top of the escalator pose. Be sure to check out the new exhibit on *Protohadros byrdi* found near Lake Grapevine, and its tracks that were found along the shoreline. The actual tracks have been covered for their protection, but here you can see casts of three of them. The fossil preparation lab opened a few years ago, with a new mount of *Nanuqsaurus hoglundi* menacing above.



The minerals hall on the third floor has a new temporary exhibit through September 6th called “Nature’s Art - The Mineral Beauty of China.” The spectacular minerals, on loan from local collectors, are dazzling. China is becoming well known for great specimens of fluorite, calcite, cinnabar, and cassiterite, and has always been one of the best sources of giant stibnite crystals. Less known or new are peridot in mantle xenoliths in basalt, and diamonds from kimberlite pipes. One case shows three examples where mineral specimens were incorporated into larger works of Chinese cultural art.

“The Science of Guinness World Records” exhibit is located downstairs, also through September 6 (so go soon). This one is a lot of fun for kids, with many activities to do with their scores recorded on the various challenges via thumbprints. But don't worry, there are dispensers of hand sanitizer everywhere. Still, you will probably want to wash up thoroughly when done. Very popular was the giant PacMan game, and the basketball shooting games were going constantly. You can try to stack cups, complete puzzles, and build Legos faster than others. Some of the challenges are physical (balancing on a beam, hanging from a bar), others are mental (memorization, recognition), and some are a combination (reflexes).



The world records do not directly relate to paleontology, but the science behind the challenges is explained, and some of that science relates to what we do. One exhibit shows how a “mental image” can be used to find an object among a crowd of similar objects, which is very useful for fossil collecting. Many experienced collectors study specimens in books and museums, or examine the finds of others in the field, to help them see them more readily. Another exhibit showed how we can get better at remembering people's names, which will be useful to us when we start meeting again. Unfortunately, after I did the game once and hoped to do even better the next time, the machine scrambled the names of the faces and my score plummeted. Fossils are often renamed, but fortunately paleontologists use distinctive new names to try to eliminate such confusion.

The exhibit includes video interviews with people who have accomplished world records of various types. One young woman disproved her math teacher's assertion that you can't fold a piece of paper more than eight times. She first showed that it could be done with gold leaf, which is incredibly thin. But paper is thicker, and she developed equations showing that an important limit was the amount of paper in the radii of the folds. To get more folds, you need a much longer piece of paper, and she derived the complicated equation to determine how much. She calculated how long she would need, found a very long hallway to lay it out and start folding, and broke the record. Math rules!

LADONIA'S TEMPORARY FOSSIL PARK (LADONIA, TX)

Review by Kate Fenton

The contrast between the old and the new temporary Ladonia Fossil Park is stark! Ever dream of an easy entry to a rich fossil site? Just about a half mile west of the old site, the temporary new Fossil Park sits atop a flat, chat-graded half acre on the east side of the FM 2990 bridge. The turn-off from SH 11 on to FM 2990 about two miles west of Ladonia is clearly marked with a bright orange sign. A similar orange sign marks the entrance to the park on the northeast side of the FM 2990 bridge.

The old Fossil Park arch has been transported to the beginning of the trail to the river. The first half of the trail is well graded and topped with chat to minimize miring in mud in the event of recent rains before you even hit the river. But as the trail begins its approximate thirty degree descent to the river, visitors are greeted with the welcoming sight, half way down, of a straight ribbon of concrete sidewalk, an estimated 25 feet long and 8 feet wide. This sidewalk delivers the fossil hunter straight to the North Sulphur River's rocky bed. Gone is the drama of a difficult river descent of the past. This trail is easy for children and elderly fossil hunters alike, as well as everyone in between. A wagon of tools or provisions could be pulled.



If you need a restroom or cold drink before or after your trek, there is a gas station with a convenience store at the junction of SH 11 and FM 2990, at the first orange sign to the new Fossil Park. Afterwards, we picnicked on the Ladonia City Hall grounds on the town square on one of the four picnic tables scattered in the shade of live oaks. It was a lovely day and the park was a great surprise, in its ease of access.

Regarding the NSR fossil experience, prepare by studying the DPS's *Fossil Collector's Guidebook to the North Sulfur River, Vol. 4* (2019). Use plenty of sunblock and bug repellent to ward off the half-inch black horse flies whose bite can draw blood. Bring plenty of water for the temperature of the riverbed felt about fifteen degrees warmer than on top at the Fossil Park arch. The river water was surprisingly hot, hotter than my bath water, due to it running over the dark shale on a sunny July day. So, take all your usual precautions to stay cool!



OLIVER CREEK FIELD TRIP (SATURDAY, AUGUST 14TH)

Event Announcement by Roger Farish

FOSSIL COLLECTING — the perfect COVID activity where we all spread out in the open air.

COVID survivors, here's where we're headed — a cool, clean, clear stream babbling over limestone and close to home, unheard of, right? Well, just a few dozen miles north of Fort Worth, a bit northwest of Justin is Oliver Creek. A while back we tracked a creek full of tumbled fossils upstream to their source and the gracious landowners have consented, once again, to let us tromp up and down their lovely creek. Not only is it a neat place for a pastoral outing and picnic, but the soft limestone yields ammonites, like *Oxytropidoceras* (you will be required to say this) and echinoids (sea urchins) like *Epiaster whitei*, *Heteraster texanus*, and the rarer, regular *Saleinia mexicana*, as well as a few shark teeth. Seams of soft marl hold echinoids ideal for mining. So, you WILL find ammonites and you WILL find echinoids as well as the rest of the typical marine fauna like crab parts, gastropods (snails), and pelecypods (bivalves).

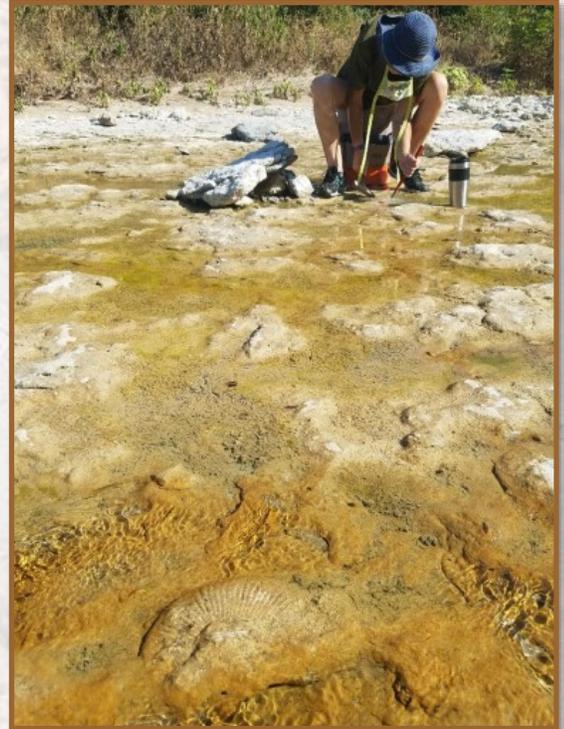
We'll be collecting on very private land in the Goodland Formation (Lower Cretaceous, Middle Albian) just west of Drop, Texas (don't look for skyscrapers here). This is a fairly large, open creek bed so many people can collect. **Perfect for kids** — they will find neat stuff — and pets. Just mind your invitees. We are out in nature, so expect the normal fare of bugs and other creepy crawlers. Hopefully we'll have water in the creek this year so kids can splash or do tadpoles and crawdads.

Meet us at 8:30 AM in Justin, Texas on Hwy 156 where it shares the road with Hwy 407 at the Justin Discount Boot Store parking lot right on the highway. Or a simpler way to say it is to go to Justin and meet at the 'horse.' This is all north and a bit west a few miles of the Texas Motor Speedway on I-35W, north of Hwy 114.

Bring your hard-rock tools (hammer, chisels), wading shoes, little clothing, sun protection and plenty of liquids. Collecting buckets will be provided. Much of the creek is overhung by large trees, so shade is available although I am working on some way to rent it out — for the Society benefit, of course. We'll lunch by the creek, so pack your brown bag. The Society will furnish some drinks and dessert — BTW, how are your seed-spitting skills? Please let me know if you can bring an iced-down melon (will reimburse).

As always, check the **Paleo Hotline (817-355-4693 metro)** for any last-minute changes, but rain (hopefully) or shine, we will do this one. If you have specific questions or if you get lost on that Saturday please contact: Roger Farish at rffarish@verizon.net, phone 972-898-2700.

Don't be late — IT'S SUMMER — we need to beat the heat.



SHERMAN CREEKS FIELD TRIP WRAP-UP (SHERMAN, TX)

Event Overview by Roger Farish

Yes, it is supposed to be hot, as in near 100°F. BUT collecting in the deep shade, feet in the cool water with a nice breeze AND finding periodic shark teeth — WHAT MORE COULD FOSSIL LOVERS ASK FOR???

After the scheduled June trip was totally washed out, I was apprehensive that our fossil-hungry membership would be desperate just to get out 'in the dirt'. So, the anticipated a hundred people, turned out to be only twenty-nine, BUT it was a perfect group where everyone could get to know each other. We split into two groups, so there was plenty of room to get at the good spots (its all good). There were nine first-timers and a number of families that had some good bonding time. It's so wonderful to get kids out into the 'wild' early, or they may never learn to appreciate it.

The tag team of Kym and Kelly Forrest found their share of teeth including Kelly's 1½" *Cretoxyrhina* (under a leaf, he said) which is relatively uncommon on the creeks. Ken Tillman scored a large bison tooth while daughter, Kate, had a large collection of shark teeth including the most tiny teeth (those young eyes are amazing). Mike and Julia Zepeda, with kids, Sebastian and Anthony, found good teeth not only screening but surface collecting the top of a gravel bar at the old nursing home site. Co-leader of the trip, Steve Schliesing, had a good collection with three good *Ptychodus* while Jim Poepsel had six. Dozens of *Ptychodus* (only *P. whipplei* this time) were given new homes, despite collecting in other people's footprints as these creeks are heavily collected (for instance, we passed two families — nine people entering the Travis Street site as we were leaving). Juan Correa found the largest *Ptychodus* adding to Fernando's collection. It's a shame we aren't having face-to-face meetings so that you could see what Ruth and Hannah Louk, Michael, Clark and Leif McKinney, and Ron and Fernando Carrillo found on the creek.

We did have a good show-and-tell at Dickey's BBQ around noon but were unable to visit the Basserman's wonderful collection up in Denison.

Thanks to Steve Schliesing for helping organize and shepherding and Murray Cohen provided support. Michael Hogan very cleverly captured life on the creek shots. Thanks.



UNIVERSAL STUDIOS' "VELOCICOASTER" (ORLANDO, FL)

Review by Whitney Swinford

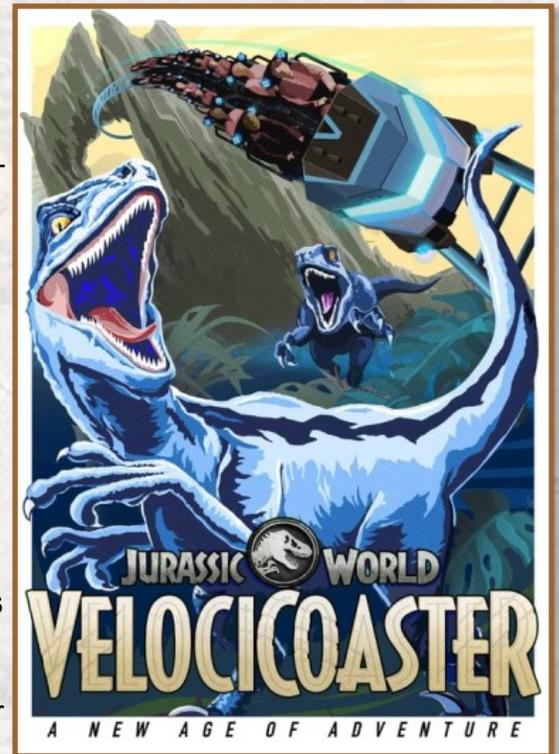
Universal Studios is playing the long game when it comes to their Orlando attractions. While "Hagrid's Magical Creatures Motorbike Adventure" continues to bring in new guests, that ride opened two years ago. Universal was ready for their next reveal and while it didn't have a connection to their new Epic Park, it connects to one of their best intellectual properties: *Jurassic Park*.

Orlando's Islands of Adventure has been the scene for *Jurassic Park* fans since 1996, but it was time for a change. Fans still love the classic *Jurassic Park*, but the new movies have their fans as well. Universal listened and built "The Velocicoaster." At one hundred and fifty five feet tall and seventy miles per hour, this may be the most intense roller coaster Universal has to offer. Due to this intensity, they are strict about removal of items in your pockets as they will slide out while you are on the ride and more than likely landing in the nearby water.

While the stats are impressive and the ride is very fun, that isn't what makes "The Velocicoaster" special. The theming is what sets this ride apart from the likes of "Hulk," a short walk away in the same park. Walking to the ride, you are already immersed in the island theming of Isla Nublar. As you enter the building, you'll see a giant statue of Blue's pack and many Ingen props, immersing you in the role of a visitor to their facilities. There are several in-world computer screens simulating the science and pseudo-science behind the dinosaurs and their creation. You'll even see animatronic busts of "Velociraptors" as well, with their heads strapped in the familiar metal frames of *Jurassic World*.

If the props and animatronics weren't impressive enough, Universal pulled in the actors from *Jurassic World* to give the finishing touch. Actor B.D. Wong reprises his role again as Doctor Wu, talking through Ingen's process of cloning. After that, Chris Pratt and Bryce Dallas Howard talk about your upcoming adventure. You are going to race alongside the Raptor pack! While, in actuality, you are on the roller coaster, the raptors can be spotted throughout the ride to complete the story.

Universal has really shown their love for the *Jurassic Park* franchise with this attraction. Hopefully, their next step is to update the "*Jurassic Park River Adventure*," as their dinosaurs have not aged well in the past twenty-five years. If there is enough continued traffic to the "Velocicoaster," and *Jurassic World: Dominion* is a success, these updates or more rides will be a sure bet in the future.



WOMEN IN PALEONTOLOGY: MIGNON TALBOT

Series by Reah Easley

Mignon Talbot (1869-1950) earned her undergraduate degree in Geology at Ohio State University in 1892 and her doctorate in Paleontology from Yale in 1904. She spent much of her scientific career as a professor at Mount Holyoke College, a women's college in Massachusetts. Her claim to fame and what most writers mention about her is that she found "a real live fossil!"

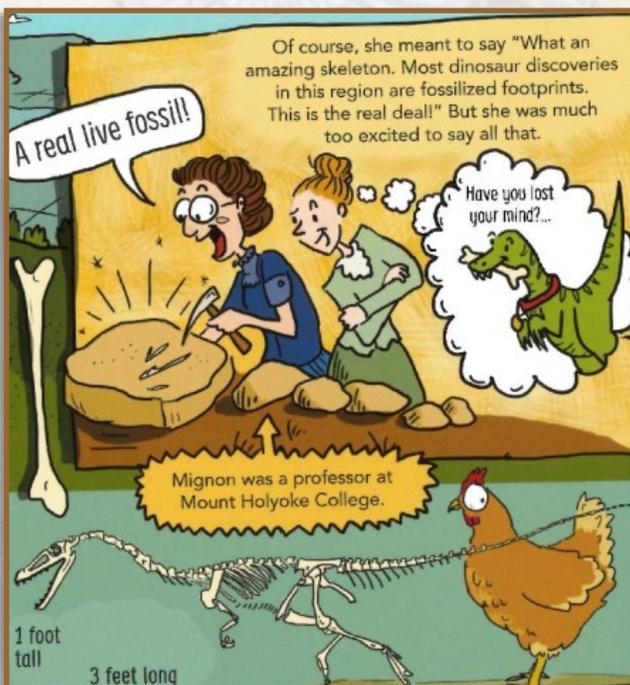
She grew up in and lived through periods of great cultural and technological changes in the United States. When she was born, Reconstruction was still going on in the South, and the West was bustling with wagon trains of new settlers opening farm and grazing acres by the millions. As she grew up in a second industrial revolution, supported by abundant natural resources, scenery-changing steel, population shifts, and interspersed with wars, large and small, life for independent and educated women changed for the better. Eastern towns and cities experienced an era of growth in social reforms including new roles for women in education and business and the right to vote.

Mignon was comfortable with her life in her idyllic mountain home. She enjoyed taking her long-skirted geology students on frequent jaunts into the hills and river bottoms, studying talus and strata, and finding minor or broken marine fossils. On another search with her sister Ellen, Mignon made her delightful exclamation of discovery. She became the first woman to find, excavate, and name a dinosaur skeleton. Describing the mostly complete creature in 1911, she named it *Podokesaurus holyokensis*. Although the specimen was destroyed by fire only a few years later, the residents of Massachusetts have recently selected it as their state dinosaur.

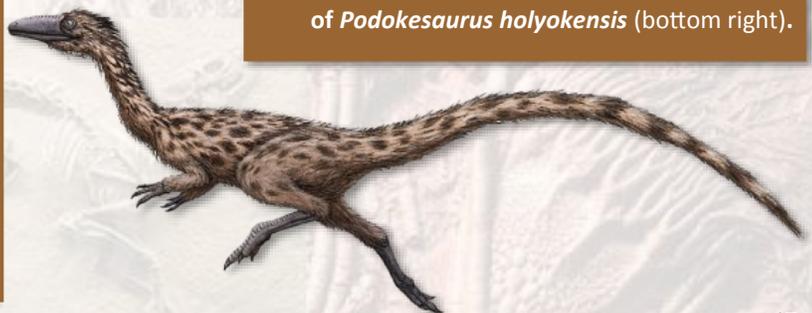
Mignon Talbot went on to nearly single-handedly rebuild the Mount Holyoke College geology collections that were also lost in fire. An intelligent and sharp-eyed collector she roamed her beloved mountains until her death in 1950. Things continued to change in the United States during her lifetime including the addition of five states, personal telephones replacing telegraphs, two World Wars, Prohibition for thirteen years, the Great Depression and Dust Bowl, the rise and fall of railroads replaced by the automobile, a flood of emigration populations that have enhanced this country's intellectual resources, and the beginnings of the technology that has put robotic geologists on Mars.



Mignon Talbot.



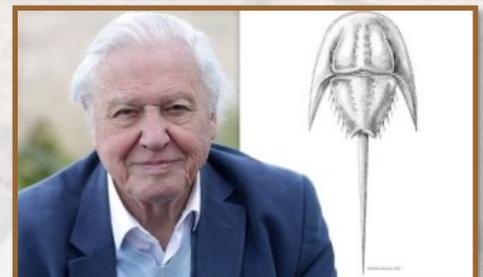
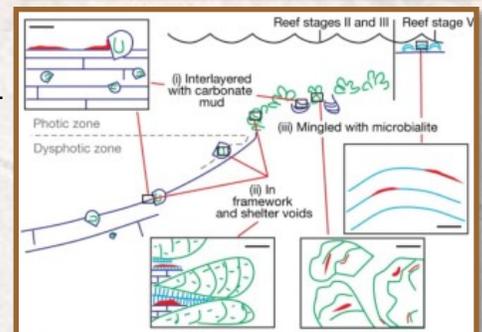
Mignon Talbot depicted in *Daring to Dig: Adventures of Women in American Paleontology*, by Beth Stricker (bottom left), and a reconstruction of *Podokesaurus holyokensis* (bottom right).



PALEONTOLOGY IN THE NEWS

Compiled by Andrew “Dino Dad” Stück and Diane N. Tran

1. [Flapling Pterosaurs](#) ([Nature](#)) — Drs. Darren Naish, Mark Witton, and Liz Martin-Silverstone have published a study on juvenile pterosaurs, providing detailed support for the hypothesis that pterosaurs were able to fly almost immediately upon hatching, and likely needed very little parental care. Due to differences in size and shape between juvenile and adult pterosaurs, they likely progressed through multiple niches within the ecosystem as they grew to full size. The authors also favor the term “flapling” to refer to precocial juvenile pterosaurs.
2. [First Animal Life](#) ([Nature](#)) — Elizabeth Turner announced in *Nature* the discovery of fossil structures that may represent the earliest known sponges, predating the Cryogenian. Some have question whether animal life could have survived before the Great Oxygenation Event, but these sponges seem to have lived in close proximity to “reefs” of oxygen producing Cyanobacteria, which increased local oxygen levels to a point capable of sustaining the sponges.
3. [Attenborough’s Horseshoe Crab](#) ([PeerJ](#)) — A new horseshoe crab from the Triassic has been named *Attenborolimulus superspinosus* in honor of the famed naturalist Sir David Attenborough. It belongs to a divergent clade of Triassic horseshoe crabs that slightly rebelled against the conservative body plan horseshoe crabs are otherwise famous for, though not by much. *Attenborolimulus* in particular is noticeably narrower than the typical horseshoe crab, with proportionally longer genal spines.
4. [Ichthyornis Lacks Enlarged Forebrain](#) ([Science Daily](#)) — Fossils of early birds almost always have crushed skulls, but a newly-discovered *Ichthyornis* specimen has a mostly intact skull that preserves details of the brain. The forebrain orchestrates many high-level cognitive tasks, and it tends to be enlarged in highly intelligent animals; however, *Ichthyornis* and other extinct lineages lacked this trait, which may shed light on why some early birds survived the K-Pg extinction, while close relatives like *Ichthyornis* perished.
5. [New Titanosaur Found in Australia](#) ([SciTech Daily](#)) — *Australotitan cooperensis*, meaning the “Southern Titan of the Cooper,” is a new species of giant sauropod from Eromanga in southwest Queensland, Australia, and has been scientifically described by paleontologists and staff at Queensland Museum and the Eromanga Natural History Museum.



Reconstruction of the life cycle of pterosaurs (top); paleoenvironments occupied by Little Dal vermiform microstructure interpreted as possible body fossils of keratose sponges (second); naturalist Sir David Attenborough and reconstruction of his namesake horseshoe crab, *Attenborolimulus superspinosus* (third); fossilized skull of *Ichthyornis dispar* (fourth); and reconstruction of titanosaur *Australotitan cooperensis* (bottom).

DINO BO BULLETIN

by Beau “Dino Bo” McDaniel

Pachycephalosaur is a very curious animal. Yes, he had that hard bowling ball on his head. And yes, he had two growth stages that are often counted as their own species. While *Stygimoloch* is cool and all, I will miss most the *Dracorex hogwartsia* name. But I digress, no, there’s something else entirely that really raises the eyebrows about *Pachycephalosaur*.

Several years ago, a paleontologist stumbled upon a nearly complete skull of *Pachycephalosaur*, the first one ever found. Now *Pachycephalosaur* teeth have been known for years to be super tiny and to look like a typical leaf-eater’s tooth. Which isn’t a shock at all because it’s a herbivore right? Right? Or is it?



*Pachycephalosaur
wyomingensis.*

Found in this jaw were some very curious looking teeth. Fangs that had serrations on them! Now, why in the world would an herbivore have serrated blade-shaped teeth? That is a wonderful question. The best theory right now is that this young *Pachycephalosaur* was an omnivore, meaning it ate both meat and plants. This find however brings to light many questions. The biggest of which is, was this adaptation only in young *Pachycephalosaur*’ or were the adults omnivores, too? An adult *Pachycephalosaur* has an enlarged abdomen, which is characteristic in plant-eating dinosaurs. So, did this go away when they got older?

As usual the answer to these questions lies in finding more fossils. Still, it’s an exciting development in paleontology. For so long we thought we knew what *Pachycephalosaur* was, just another herbivore. It just goes to show that even the most basic things like determining what a dinosaur ate, can surprise us when we find more fossils. I’m excited about what the future holds for this dinosaur, and even more excited to learn about what other things we’ve assumed about for dinosaurs and been so very wrong.

PIN ON THE EDITOR’S HAT

Series by Diane N. Tran

Since joining the DPS, my hat, which is covered with paleo-related enamel pins, has garnered much attention and every month will spotlight a different pin:

One of the last non-avian dinosaurs before the Cretaceous-Paleogene extinction event, *Pachycephalosaur wyomingensis* (from [Mind-Direct](#)), meaning “thick-headed lizard from Wyoming,” despite its bipedal stance, is more closely related to the ceratopsians than the ornithomids. It is commonly hypothesized that pachycephalosaurids used their domed heads for intraspecific combat, where males would challenge each other headlong, horizontally straightening their head, neck, and body in order to transmit stress during ramming. However, the cervical and anterior dorsal vertebrae show that the neck was carried in an “S”- or “U”-shaped curve, rather than a straight orientation, and thus unfit for transmitting stress from direct head-butting; and the rounded shape of the skull would lessen the contacted surface area during head-butting, resulting in glancing blows. Alternatively, they may have engaged in more flank-butting, after intimidation displays failed to cow their rivals, by lowering its head and striking the rival on its flank. This hypothesis is supported by the relatively broad torso of most pachycephalosaurs that would have protected vital organs from trauma.



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The Dallas Paleontological Society was founded in 1984 for the purpose of promoting interest in and knowledge of the science of paleontology. It was intended by the founding members that the Society would be a network for the exchange of data between professionals and serious amateurs in this field.

dallaspaleo.org

The Dallas Paleontological Society meets the second Wednesday of every month at 7:00pm at Brookhaven College, unless we have something special happening that month. Please [check our calendar](#) for exact dates. Original versions of minutes and treasury reports will be available upon requests. Come meet with us, hear a speaker, learn about paleontology, and bring your unidentified fossils and unique finds to share with the group. You will be welcome, and we will enjoy meeting you. For a map of our meeting location visit dallaspaleo.org/contact.

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A special PSA from a *Tyrannosaurus* from Borneo Convention Center (Kuching, Sarawak, Malaysia): "Avoid extinction, wear a mask, and get vaccinated!"



CONTENTS INSIDE:

- Livestreaming the DPS August meeting [online](#), and join us for Oliver Creek Field Trip, DPS Holiday Party, and FOS-SILMANIA [in person](#)!
- "Amber Fever" and overviews of the DPS July meeting, Perot Museum of Science and Nature's "Guinness World Record" exhibit (Dallas, TX), Sherman Creek Field Trip (Sherman, TX), Temporary Ladonia Fossil Park (Ladonia, TX), and Universal Studios' "The Velocicoaster" (Orlando, FL)!
- "Women in Paleontology," "Dino Bo Bulletin," "Pin in the Editor's Hat," etc.
- Reviews, updates, news, and more!



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